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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/810,342

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Raymond H. Bryden

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LARSON NEWMAN ABEL POLANSKY & WHITE, LLP  
5914 WEST COURTYARD DRIVE  
SUITE 200  
AUSTIN, TX 78730

EXAMINER

O HERN, BRENT T

ART UNIT

PAPER NUMBER

1772

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

01/17/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

10/810,342

Applicant(s)

BRYDEN, RAYMOND H.

Examiner

Brent T. O'Hern

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1772

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 7 Decembe 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 40-48, 50, 57-63, 65, 66 and 70 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 40-48, 50, 57-63, 65, 66 and 70 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Claims***

1. Claims 40-48, 50, 57-63, 65-66 and 70 are pending.

### **WITHDRAWN REJECTIONS**

2. The 35 USC 102(b) rejections of claims 40-42, 44-52 and 53 as being anticipated by Sonntag (US 6,143,239) of record in the Office Action mailed 7 August 2006, page 2, paragraph 2, have been withdrawn due to Applicant's amendments in the Paper filed 7 December 2006.

3. The 35 USC 103(a) rejections of claims 43 and 65-67 as being unpatentable over Sonntag (US 6,143,239) in view of Dussaulx et al. (US 4,990,469) of record in the Office Action mailed 7 August 2006, page 5, paragraph 2, have been withdrawn due to Applicant's amendments in the Paper filed 7 December 2006.

4. The 35 USC 103(a) rejections of claims 54-60 and 63-64 as being unpatentable over Sonntag (US 6,143,239) in view of Hida (US 4,948,761) of record in the Office Action mailed 7 August 2006, page 6, paragraph 3, have been withdrawn due to Applicant's amendments in the Paper filed 7 December 2006.

5. The 35 USC 103(a) rejections of claims 61-62 as being unpatentable over Sonntag (US 6,143,239) in view of Hida (US 4,948,761) and Hillig (US 4,640,899) of record in the Office Action mailed 7 August 2006, page 8, paragraph 4, have been withdrawn due to Applicant's amendments in the Paper filed 7 December 2006.

6. The 35 USC 103(a) rejections of claims 68-70 as being unpatentable over Sonntag (US 6,143,239) in view of Hillig (US 4,640,899) of record in the Office Action

mailed 7 August 2006, page 8, paragraph 5, have been withdrawn due to Applicant's amendments in the Paper filed 7 December 2006.

## NEW REJECTIONS

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 65 and 66 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 65 recites the limitation "**the nitride bonded silicon carbide body**" in line

7. There is **insufficient antecedent basis** for this limitation in the claim.

Clarification and/or correction is required.

### ***35 U.S.C. 103(a) Rejections***

8. Claims 40-42, 44-48, 50, 57-60, 63 and 65-66 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sonntag (US 6,143,239) in view of Hida (US 4,948,761).

Regarding claim 40, Sonntag ('239) teaches a ceramic component (*col. 1, l. 7*) comprising a ceramic body comprising silicon carbide (*col. 1, l. 8*) and an oxide layer (*col. 4, ll. 38-53 and col. 2, ll. 53-57*) the oxide layer containing an amorphous matrix phase comprising silica (*See col. 3, ll. 25-55 wherein the amorphous matrix with "part crystalline" comprising silica, SiO<sub>2</sub>*) and a crystalline phase provided in the amorphous matrix phase (*col. 3, ll. 25-49*), the crystalline phase comprising alumina (*col. 4, ll. 38-*

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48, *alumina*  $Al_2O_3$ ), however, fails to expressly disclose a crystalline phase with anisotropically-shaped crystals.

However, Hida ('761) teaches anisotropically-shaped crystals (*col. 2, ll. 20-28*) for the purpose of providing crystals having very good strength properties (*col. 2, ll. 38-43*).

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to modify Sonntag's ('239) component with crystals anisotropically-shaped as taught by Hida ('761) in order to provide a component having good strength.

Regarding claims 41 and 45-46, Sonntag ('239) teaches a ceramic component wherein the ceramic body comprises nitride bonded silicon carbide (*col. 4, ll. 53-57*).

The phrase "is formed by reacting a green body with nitrogen while heating, the green body containing silicon carbide and silicon" in claim 45, lines 1-3 are **process limitations** in product claims and hence not given any patentable weight since patentability of a product does not depend on its method of production (*see MPEP § 2173.05(p)*).

The phrase "wherein the green body is formed by slip casting a slurry containing silicon carbide and silicon, forming a cast, and drying the cast" in claim 46, lines 1-3 are **process limitations** in product claims and hence not given any patentable weight since patentability of a product does not depend on its method of production (*see MPEP § 2173.05(p)*).

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Regarding claim 42, Sonntag ('239) teaches a ceramic component wherein the ceramic body comprises silicon carbide as a primary component (*col. 1, ll. 46-53*) and silicon nitride as a secondary component (*col. 4, ll. 53-57*).

Regarding claim 44, Sonntag ('239) teaches a component wherein the ceramic body has a porosity within a range of about 5 to about 25 vol% (*col. 1, ll. 21-28*).

Regarding claim 47, Sonntag ('239) teaches a component wherein the ceramic component is a refractory component (*col. 3, ll. 42-44 and col. 1, ll. 19-21*).

Regarding claim 48, Sonntag ('239) teaches a component wherein the refractory component is selected from a group consisting of support posts, support beams, support plates, and containers (*col. 1, ll. 19-21*).

Regarding claim 50, Sonntag ('239) teaches a component wherein the crystalline phase includes the aluminosilicate, the aluminosilicate comprising mullite, the mullite having a composition  $3\text{Al}_2\text{O}_3\text{-}2\text{SiO}_2$  (*col. 4, ll. 42-48*).

Regarding claims 57-60, Sonntag ('239) teaches a ceramic body discussed above, however, fails to expressly disclose wherein the crystals are anisotropically-shaped with an aspect ratio not less than about 3:1/5:1, with a crystal size of about 0.2 to about 20 microns/ (0.5 to about 10 microns).

However, Hida ('761) teaches wherein the crystals are anisotropically-shaped (*col. 2, ll. 20-28*), have an aspect ratio not less than about 3:1/5:1 (*col. 2, ll. 22-28*) and with a crystal size of about 0.2 to about 20 microns/ (0.5 to about 10 microns) (*col. 2, ll. 20-28*) for the purpose of providing crystals having very good strength properties (*col. 2, ll. 38-43*).

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to modify Sonntag's ('239) component with crystals anisotropically-shaped and having the above dimensions as taught by Hida ('761) in order to provide a component with good strength.

Regarding claim 63, Sonntag ('239) teaches wherein the oxide layer is a surface layer (*col. 4, ll. 38-41 and col. 1, ll. 37-40*).

Regarding claims 65-66, Sonntag ('239) teaches the component discussed above, however, fails to expressly teach wherein the oxide layer is alumina rich having not less than 5 wt%/(7%) more alumina than an alumina content in the silicon carbide body.

However, Sonntag ('239) teaches alumina concentrations between 3 and 30% and 3 moles  $\text{Al}_2\text{O}_3$  for every mole of  $\text{SiO}_2$  (*see col. 3, l. 56 to col. 4, l. 9 and ll. 38-53*), thus, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide various concentrations of alumina rich oxide, including not less than 5 wt%/7 wt% more alumina than an alumina content in the silicon carbide body, as aluminum is not required for the underlying ceramic, for the purpose of providing an oxidation protective layer for the components (*See col. 4, ll. 38-43*).

9. Claim 43 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sonntag (US 6,143,239) in view of Hida (US 4,948,761) and Dussaulx et al. (US 4,990,469).

Sonntag ('239) teaches the component discussed above, however, does not expressly disclose wherein the ceramic body comprises about 5 to about 35 wt% silicon nitride.

However, Dussaulx ('469) teaches wherein the ceramic body comprises about 5 to about 35 wt% silicon nitride (*col. 1, ll. 42-45*) for the purpose of providing a material exhibiting excellent thermal stability and excellent bending strength (*col. 2, ll. 34-36*).

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to modify Sonntag's ('239) component with the above silicon nitride concentration as taught by Hida ('761) in order to provide a component exhibiting excellent thermal stability and bending strength.

**10.** Claims 61-62 and 70 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sonntag (US 6,143,239) in view of Hida (US 4,948,761) and Hillig (US 4,640,899).

Regarding claims 61-62, Sonntag ('239) teaches wherein the amorphous matrix phase comprises the silica (*col. 3, ll. 34-35 and 42-44*), however, fails to expressly disclose about 10 wt% to about 50% (at least 12 wt%) alumina.

However, Hillig ('899) teaches about 10 wt% to about 50% (at least 12 wt%) alumina (*col. 2, ll. 49-58*) for the purpose of providing a structure exhibiting a high melting temperature and low thermal expansivity (*col. 1, ll. 24-30*).

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to modify Sonntag's ('239) component with the above alumina concentrations as taught by Hillig ('899) in order to provide a component exhibiting a high melting temperature and low thermal expansivity.

Regarding claim 70, Sonntag ('239) teaches a ceramic component discussed above, however, fails to expressly disclose wherein the amorphous matrix phase comprises not greater than about 25 wt% alumina.



However, Hillig ('899) teaches wherein the amorphous phase comprises not greater than about 25 wt% alumina (*col. 2, ll. 49-58*) for the purpose of providing a structure exhibiting a high melting temperature and low thermal expansivity (*col. 1, ll. 24-30*).

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to modify Sonntag's ('239) component with the above alumina concentration as taught by Hillig ('899) in order to provide a component exhibiting a high melting temperature and low thermal expansivity.

#### **ANSWERS TO APPLICANT'S ARGUMENTS**

**11.** In response to Applicant's argument (*p. 5, para. 5 of Applicant's Paper filed 7 December 2006*) that Dussaulx ('469) fails to address the deficiencies of Sonntag ('239), it is noted that Applicant failed to address any of the teachings of Dussaulx ('469).

**12.** In response to Applicant's argument (*p. 7, para. 2 of Applicant's Paper filed 7 December 2006*) that Sonntag ('239) does not teach an amorphous matrix, it is noted that Sonntag ('239) teaches an oxide layer containing an amorphous matrix phase comprising silica (*See col. 3, ll. 25-55 wherein the amorphous matrix with "part crystalline" comprising silica, SiO<sub>2</sub>*) and a crystalline phase provided in the amorphous matrix phase (*col. 3, ll. 251-49*). Furthermore, Applicant has not limited the size of the amorphous matrix phase.

**13.** In response to Applicant's argument (*p. 7, para. 3 of Applicant's Paper filed 7 December 2006*) that Hida ('761) would not result in needle-shaped crystals comprised

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of alumina or an aluminosilicate, it is noted that applicant does not claim needle-shaped crystals comprised of alumina or an aluminosilicate but rather "anisotropically-shaped crystals", thus Applicant's argument is not germane to any issue at bar.

**14.** Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brent T. O'Hern whose telephone number is (571) 272-0496. The examiner can normally be reached on M-F, 9:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Harold Pyon can be reached on (571) 272-2172. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

BTO

Brent T O'Hern  
Examiner  
Art Unit 1772  
January 5, 2007

 1/9/07  
NASSER AHMAD  
PRIMARY EXAMINER